**EZY-GUARD 4 Steel Rail Safety Barrier - Permanent**

### Product summary

<table>
<thead>
<tr>
<th>Status</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
<td>Permanent – Flexible Longitudinal Barriers</td>
</tr>
<tr>
<td>Test Level</td>
<td>MASH TL3: 100km/h</td>
</tr>
<tr>
<td>Supplier</td>
<td>Ingal Civil Products</td>
</tr>
<tr>
<td>Description</td>
<td>Ezy Guard 4 Steel Rail Safety Barrier is a permanent longitudinal barrier.</td>
</tr>
</tbody>
</table>

### Introduction and purpose

This detail sheet is intended to supplement VicRoads Road Design Note 06-04 - Accepted Safety Barrier Products. Please refer to RDN 06-04 for the current VicRoads acceptance status, information on the product assessment process and general acceptance conditions.

The technical details within this document have been extracted from information submitted to VicRoads by the Supplier and the recommended ‘Conditions for Use’ from the Austroads Safety Barrier Assessment Panel (ASBAP).

**VicRoads requirements take precedence over the product manual and Austroads conditions.** Where a departure from these requirements is required, users should understand the risks and document their engineering decisions.

For more detailed product information, refer to the individual product manual or contact the System Supplier.

### Technical information

The Ezy Guard 4 Steel Rail Safety Barrier should be designed, installed and maintained in accordance with the following VicRoads conditions for use.

These conditions for use have been based on an Austroads assessment of technical performance against AS/NZS 3845 and contain VicRoads specific requirements when necessary.

### Summary Conditions for Use

<table>
<thead>
<tr>
<th>Accepted configuration</th>
<th>Ezy Guard 4 Steel Rail Safety Barrier – Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variants</td>
<td>Standard Installation Back to Back Installation Ezy Lift – only to be installed where the road surface has been overlayed Surface Mount – Refer to system conditions Socketed – Refer to system conditions</td>
</tr>
<tr>
<td>Deflection</td>
<td>1.65m metres</td>
</tr>
<tr>
<td>Product manual reviewed</td>
<td>Ingal Civil Product Ezy Guard 4, Product &amp; Manual, April 2016 Release</td>
</tr>
<tr>
<td>ASBAP issue</td>
<td>5 September 2017 for Ezy Guard 4 Steel Rail Safety Barrier</td>
</tr>
</tbody>
</table>

Refer VicRoads conditions for use (below).
VicRoads Conditions for Use

Tested design requirements

<table>
<thead>
<tr>
<th>Containment level</th>
<th>Speed (km/h)</th>
<th>Vehicle mass (kg)</th>
<th>Point of Redirection (m)*</th>
<th>Minimum length of barrier (m)</th>
<th>Post/Pin Spacing (m)*</th>
<th>Dynamic deflection (m)</th>
<th>Working width (m)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASH TL-3</td>
<td>100</td>
<td>2270</td>
<td>Refer to appropriate approved terminal conditions</td>
<td>56</td>
<td>2.0</td>
<td>1.65</td>
<td>1.65</td>
<td>MASH Dynamic Deflection imposed on all variant(s)</td>
</tr>
</tbody>
</table>

Approved Terminals and Connections

<table>
<thead>
<tr>
<th>Public Domain Products</th>
<th>Proprietary Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-Beam Guardrail</td>
<td>ET 2000 Plus Terminal</td>
</tr>
<tr>
<td>Thrie-Beam Guardrail</td>
<td>Trend 350 Steel Rail Terminal</td>
</tr>
<tr>
<td>Type F Concrete Safety Barrier</td>
<td>Refer to ET 2000 Plus Terminal Detail Sheet conditions of approved use</td>
</tr>
<tr>
<td></td>
<td>Refer to Trend 350 Terminal Detail Sheet conditions of approved use</td>
</tr>
</tbody>
</table>

Design Guidance

<table>
<thead>
<tr>
<th>System width (m)</th>
<th>0.2 for Standard 0.31 for Back to Back Variant</th>
</tr>
</thead>
</table>

Installation

This product must be installed and maintained in accordance with the Product Manual and Road Agency specifications. Road Agency specifications and standards shall have precedence.

Minimum distance to excavation

1. 0.5 metres minimum distance between the edge of the barrier and the edge of an excavation, is accepted without further approval.
2. Distance less than 0.5m, Seek advice from VicRoads Safe System Engineering or the Supplier for further guidance.

Slope limit

Side slope limit: 10 Horizontal to 1 Vertical (10.0%).

Systems conditions

1. Flaring across the clear zone without a terminal listed above is not permitted.
2. Installation on top of a kerb is not recommended, however if installed on top of a kerb, all system components must be free to operate.
3. EzyGuard Surface Mount Variant should be limited to constrained locations, where a driven post cannot be installed, such as across culverts, shallow rock and shallow underground services. The total length of surface mount posts should be minimised where possible. Seek advice from the Safe System Engineering team where necessary.

Minimum installation distance from batter hinge point of the slope (m)

0.5 - The proposed distance supersedes the one stated within the product & installation manual.

Gore area use

Refer to appropriate approved terminal conditions

Pedestrian area use

Permitted – consider potential for snagging and deflection.

Cycleway use

Permitted – consider potential for snagging and deflection.

Frequent impact likely

Permitted

Remote location

Permitted

Median use

Permitted
Foundation pavement conditions

<table>
<thead>
<tr>
<th>Pavement</th>
<th>Use</th>
<th>Accepted Speed (max)</th>
<th>Post/Pin spacing (m)</th>
<th>Pavement construction</th>
<th>Post/pin type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>Permitted</td>
<td>100 km/h</td>
<td>2.0m</td>
<td>Refer to Manual</td>
<td>Only for Surface Mount Variant</td>
</tr>
<tr>
<td>Deep lift asphalt</td>
<td>Permitted</td>
<td>100 km/h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphalt over granular pavement</td>
<td>Permitted</td>
<td>100 km/h</td>
<td>2.0m</td>
<td>Foundation pavement conditions must be smooth and free of snag points, kerbs or obstructions that may interfere with the operation of the product</td>
<td>Only for Surface Mount Variant</td>
</tr>
<tr>
<td>Flush seal over granular pavement</td>
<td>Permitted</td>
<td>100 km/h</td>
<td>2.0m</td>
<td>Refer to the Product Manual</td>
<td>Socketed variant to be designed – refer notes.</td>
</tr>
<tr>
<td>Unsealed compacted formation</td>
<td>Permitted</td>
<td>100 km/h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural surface</td>
<td>Permitted</td>
<td>100 km/h</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other considerations and comments

Transition to Rigid Barriers and End Posts

Ezy-Guard 4 shall be transitioned to Guard Fence where a connection to a rigid concrete barrier or bridge end post is scheduled. This transition shall be in accordance with Ingal drawing EZT-SM-020.

Socketed Variant

Socketed variant may be used in locations where there are likely maintenance benefits (e.g. narrow flush medians).

Concrete socket foundations must be designed to limit the amount of movement during an impact. The tested foundation (300mm Dia x 1000mm Deep) was installed in 100mm deep lift asphalt on 500mm weak soil (32ᶲ / 75kPa) on 400+mm weak soil (25ᶲ / 50kPa).

Damaged Components

Damaged components must be replaced. Repaired components must not be used.

References

- VicRoads Road Design Note 06-04 Accepted Safety Barrier Products.
- VicRoads Road Design Note 06-08 The Use of Guard Fence.
- VicRoads Standard Drawing SD2001 – Kerb types
- VicRoads Standard Drawing SD3573 – Guidance on the verge and permissible slopes
- VicRoads Standard Section 204 – Earthworks
- VicRoads Standard Section 708 – Steel Beam Guard Fence

Detail Sheet – Update Summary

<table>
<thead>
<tr>
<th>Issue</th>
<th>Approved</th>
<th>Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun 2017</td>
<td>NDS-SSD</td>
<td>Minor Amendment – Name Change</td>
</tr>
<tr>
<td>Oct 2017</td>
<td>NDS-SSD</td>
<td>Updated ASBAP Conditions</td>
</tr>
<tr>
<td>Jun 2018</td>
<td>M-SSD</td>
<td>Product variant inclusion</td>
</tr>
<tr>
<td>Jan 2019</td>
<td>M-SSE</td>
<td>Socketed variant added MASH update</td>
</tr>
</tbody>
</table>
**Design Terminology**

- **Direction of travel (2)**
- **Direction of travel (1)**
- **Trailing Terminal**
- **Offset to travel lane**
- **Safety Barrier**
- **Leading Terminal**
- **Trailing point of need**
- **Length of need**
- **Hazard**
- **First possible point of contact with hazard from direction 2**
- **First possible point of contact with hazard from direction 1**

**Deflection Terminology**

- **Hazard**
- **Hazard free area**
- **Dynamic deflection**
- **Safety barrier**
- **Permanent deformation**
- **Working width (vehicle roll allowance)**
- **Containment = Tested vehicle weight**
- **System width**
- **Dynamic deflection**
- **Working width**

**Terminal Terminology**

- **Point of need**
- **Minimum length of barrier**
- **Transition**
- **Point of need**
- **Minimum length of barrier**

**Flare Terminology**

- **Flare**
- **Flare length**
- **Flare width**
- **Safety Barrier**
- **Point of need with flare**
- **Flare rate = d:1**
- **Direction of travel**
- **Edge line**